

Diplom-Ingenieur Hans-Peter Klug

Born in 1944 in Rendsburg. Apprenticeship to become automobile mechanic. From 1963 to 1968 studied mechanical engineering and industrial development in Kaiserslautern and Saarbrücken, followed by several years of industrial practice; thereafter, from 1974 to October 1982, held the position of customer service and training manager at Grau-Bremse GmbH, Heidelberg. From October 1982 to June 1986 employed at the headquarters of the Deutsche Kraftfahrzeug-Überwachungs-Verein e.V., in Stuttgart (Motor Vehicle Safety Division), being responsible for Product Redesign and Quality Assurance in the motor vehicle testing branch. From July 1986 to December 1987, Manager of Service Technology and Field Force at Iveco Magirus AG, Ulm. In January 1988, opened an engineering office for Motor Vehicle Technology, in his own name and worked on his own as a motor vehicle expert specializing in brake systems and as a journalist publishing numerous articles dealing with commercial vehicle technology and emphasis on brake units.

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Besides the regular drying function, many air dryers are equipped

with an integrated pressure regulating function, so that a separate pressure regulator becomes superfluous. Since the condensation product accumulating in the air dryer might freeze in winter due to the lack of anti-freeze, the air dryers should, as a rule, be equipped with a heater to prevent said freezing.

3.2.6.3 Subsequent Installation of Air Dryers

By subsequently installing air dryers, the general operating permit for the vehicle is voided. There are sample certificates through the TÜV available for the subsequent installation of the air dryers, which, however, in principle, only state that under certain circumstances there are no serious technical objections regarding refitting.

In order to issue a new operating permit in accordance with § 19, Section 2 StVZO, the vehicle must be presented prior to that to a certified expert for the Motor Vehicle Traffic Authority (TÜV) for evaluation. Generally, there should be no difficulties, if the sample certificate is available and the installation is made in accordance with the vehicle or equipment manufacturer's specifications. Of course, the shut-down pressure and switching period of the pressure regulator must be correct; in addition, the stipulated fill times of the brake unit must not be exceeded. Releases by individual vehicle manufacturers, such as Daimler-Benz, Iveco, MAN, Kässbohrer, for air drying equipment can be requested.

Installation instructions: Installation of the air dryer between compressor and four-circuit-safety valve (Figs. 3.26, 3.27).

Do not have any anti-freezing device installed ahead of the air dryer (the function of the drying medium by the anti-freeze does no longer exist).

The length of the pipe line between the compressor and the air dryer must be about 6 m (with a gradient toward the air dryer), so that the entry temperature of the compressed air does not exceed 65°C at the air dryer.

Installation in the driving resistance area increases the water discharge.

Avoid radiation heat from, e.g., exhaust, motor, etc., since these impair the degree of the air dryer's effectiveness.

Check the air dryer with the pressure regulator for proper shut-down and starting pressures.

- A pressure regulator
- B compressor
- C air dryer
- D regeneration tank
- E Four-circuit protection valve

Figure 3.26 Installation sketch of an air dryer (according to Wabco).

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- A compressor

- B air dryer with pressure regulator
- C regeneration tank
- D four-circuit protection valve

Fig. 3.27 Installation sketch of an air dryer with pressure regulation function (according to Wabco)

3.2.6.4 Regeneration air tank

According to Knorr-Bremse, the size of the regeneration tank can be established according to the following criteria:

- ☐ total volume of the brake unit
- ☐ pressure regulator shut-off
- ☐ switching range of the pressure regulator
- ☐ duty cycle

At a duty cycle of 40%, the result is the volume of the regeneration air tank depending on the shut-off pressure of the pressure regulator and the volume of the brake unit as follows:

- (1) shut-off pressure of the pressure regulator (bar)
- (2) total volume of the brake unit (l)
- (3) regeneration air tank 4 liter
- (4) regeneration air tank 5 liter
- (5) regeneration air tank 7 liter
- (6) regeneration air tank 9 liter

Service:

Under normal operating conditions and with a functional compressor it is assumed that the granulate is replaced every 1 to 2 years.

Test:

The function of the air dryer must be checked at regular intervals.

This can be done by monitoring the water accumulation in the succeeding storage containers (drainage valve). The brake unit, in the pulling as well as the pulled vehicle, should be very tight, since leakages negatively influence the activation time of the compressor and, under certain circumstances, also the regeneration of the drying agent.

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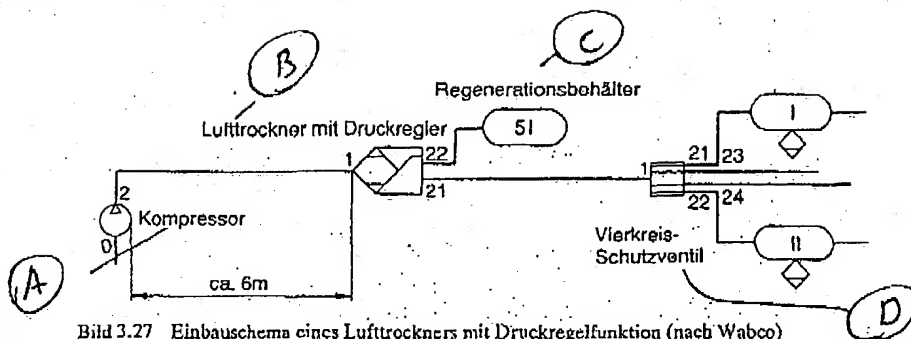


Bild 3.27 Einbauschema eines Lufttrockners mit Druckregelfunktion (nach Wabco)

3.2.6.4 Regenerationsluftbehälter

Nach Knorr-Bremse kann man die Regenerationsbehältergröße nach folgenden Kriterien festlegen:

- ☐ Gesamtvolumen der Bremsanlage
- ☐ Abschaltdruck des Druckreglers
- ☐ Schaltspanne des Druckreglers
- ☐ Einschaltdauer

Bei einer Einschaltdauer von 40% ergibt sich das Volumen des Regenerationsluftbehälters in Abhängigkeit vom Abschaltdruck des Druckreglers und des Volumens der Bremsanlage wie folgt:

- ① Abschaltdruck des Druckreglers (bar)
- ② Gesamtvolumen der Bremsanlage (l)

- ③ Regenerationsluftbehälter 4 Liter
- ④ Regenerationsluftbehälter 5 Liter
- ⑤ Regenerationsluftbehälter 7 Liter
- ⑥ Regenerationsluftbehälter 9 Liter

② \ ①	7,35	8,1	10,0	12,0
80				
100				③
120				
160	⑤	④		
200	⑥	⑤		

Wartung:

Unter normalen Betriebsbedingungen und intaktem Kompressor geht man davon aus, daß das Granulat alle 1 bis 2 Jahre erneuert wird.

Prüfung:

Die Funktion des Lufttrockners ist regelmäßig zu prüfen. Dies kann dadurch geschehen, daß man den Wasseranfall in nachgeschalteten Vorratsbehältern überprüft (Entwässerungsventil). Die Bremsanlage, sowohl im ziehenden als auch im gezogenen Fahrzeug, sollte sehr dicht sein, da Undichtheiten die Einschaltdauer des Kompressors negativ beeinflussen und die Regeneration des Trockenmittels unter Umständen in Frage gestellt ist.